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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,169	06/26/2003	Thomas J. McIntyre	BA-00577	8244

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EXAMINER

BOUTSIKARIS, LEONIDAS

ART UNIT PAPER NUMBER

2872

DATE MAILED: 05/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

10/608,169

Applicant(s)

MCINTYRE ET AL.

Examiner

Leo Boutsikaris

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 14-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 14 is a method claim drawn to a process of manufacturing an integrated photonic circuit. The first step comprises etching a photonic resonator onto a substrate. The second step comprises patterning a sensor element onto the substrate. It is not clear where the patterning of the sensor element occurs; in other words it is not clear whether the sensor is patterned at the same cross section plane intersecting the substrate, as with the resonator, or away from the resonator. It is noted that Fig. 1 is only a sketchy depiction of the circuit and does not provide cross section information about the spatial relation between the various components. Because of the above reasons, a meaningful prior art search cannot be undertaken.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 6-8, 10-11, 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Huber (US 5,159,601).

Regarding claims 1, 3, 6-7, Huber discloses a photonic circuit (Fig. 1) comprising a resonator in the form of grating 18, which is part of a tunable fiber laser, means for heating the resonator in the form of resistive heater 24, means for measuring a temperature of the grating in the form of thermistor 26, means for coupling the thermistor to the heater in the form of circuit 28, wherein the thermistor measures the temperature of the grating and transmits signals to the voltage source 30, in order to increase or decrease the amount of heat provided to the heater, so that the grating period is adjusted accordingly, for changing the wavelength of the light being passed through the grating and out of the laser cavity (line 43, col. 2 to line 10, col. 3). It is noted that in order for the system to associate a measured temperature with a desired temperature (which would cause the laser to emit the desired wavelength), it is inherent that some kind of logic is used (e.g., in the simplest form whether a measured temperature is equal or not to a set temperature).

Regarding claim 2, grating 118, heater 24 and thermistor 26 are embedded in substrate 22 (lines 52-58, col. 2).

Regarding claim 8, the temperature of the grating is sensed by a change in the change of the temperature (and hence the resistance) of the thermistor 26.

Regarding claim 13, it is inherent that during the operation of the circuit of Fig. 1, each selected wavelength for the resonator corresponds to a respective temperature, the list of which temperatures and wavelengths constituting a lookup table.

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Regarding claims 10-11, heater element 26, and thermistor 26 are in series, therefore having the same current flowing through them, the current being increased or decreased in response to the measurement of the resistance of the thermistor wire (via Ohm's law), and correspondingly, increasing or decreasing the temperature of the grating.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 3-4, 6-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Ueda (US 6,498,878).

Regarding claims 1, 3, 6-7, Ueda discloses a photonic circuit (Figs. 2-3) comprising a resonator in the form of arrayed waveguide grating 14, which is part of a WDM multiplexing/demultiplexing integrated optical circuit, means for heating the resonator in the form of thin film heater 22, means for measuring a temperature of the grating in the form of temperature detector 25, means for coupling the thermistor to the heater in the form of a feedback circuit (not shown), wherein the temperature detector measures the temperature of the arrayed grating and transmits signals to a current source, in order to increase or decrease the amount of heat provided to the heater, so that the difference between adjacent waveguides is adjusted accordingly, for changing the routes of wavelengths of the light being passed through the arrayed grating (line 23, col. 4 to line 41, col. 4). It is noted that in order for the system to associate a measured temperature with a desired temperature (which would cause the arrayed grating to perform the multiplexing/demultiplexing according to a designed protocol), it is

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inherent that some kind of logic is used (e.g., in the simplest form whether a measured temperature is equal or not to a set temperature).

Regarding claim 4, the circuit is used for photonic switching, i.e., for switching wavelengths between the various input and output channels.

Claims 1, 3, 6-8, 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Eggleton (US 6,438,277).

Regarding claims 1, 3, 6-7, Eggleton discloses a photonic circuit (Fig. 1) comprising a resonator in the form of a thermally sensitive optical element 11 which may be a grating, a resonance ring or a solid body resonance cavity, which is part of a waveguide circuit 10, means for heating the resonator in the form of heater 12, means for measuring a temperature of the resonator 11 in the form of temperature-dependent resistive element (not shown), means for coupling the temperature sensor to the heater in the form of a feedback circuit 14 wherein the temperature detector measures the temperature of the resonator and transmits signals to a current source, in order to increase or decrease the amount of heat provided to the heater, so that the temperature sensitive resonator changes its wavelength response (line 64, col. 2 to line 37, col. 3). It is noted that in order for the system to associate a measured temperature with a desired temperature (which would cause the grating to transmit or reflect the desired wavelength), it is inherent that some kind of logic is used (e.g., in the simplest form whether a measured temperature is equal or not to a set temperature).

Regarding claims 8, 10-11, the change in the temperature is measured by measuring the resistance of wire 12, using a resistance detector 16, an ohmmeter, which in effect calculates the resistance by taking the values of a voltage and a current across the line (lines 5-11, col. 3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 5, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huber (US 5,159,601) in view of Koizumi (US 5,696,543).

Huber discloses all the limitations of the above claims except for specifying that the metal wire of the temperature sensor is aluminum. Koizumi discloses a temperature sensor device wherein an aluminum wire is used as temperature sensor element 6 (Fig. 1, lines 44-56, col. 3). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an aluminum wire as a simple temperature sensor, as taught by Koizumi, since aluminum has very good thermal properties in terms of its thermal coefficient.

Claim 12 rejected under 35 U.S.C. 103(a) as being unpatentable over Huber (US 5,159,601) in view of Schwindt (US 6,720,782).

Huber discloses all the limitations of the above claim except for specifying that during the measurement of the resistance of the wire, the value of voltage is taken by using a voltmeter

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connected to the wire via a Kelvin connection. Schwindt discloses a measurement probe used in conjunction with low-current and low-voltage measurements of wafers and other electronic test devices, wherein he teaches that a voltmeter may be connected to an interconnection point which comprises a Kelvin connection (lines 26-65, col. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the voltmeter to the wire via a Kelvin connection in the device of Huber, as taught by Schwindt, since Kelvin connections compensate for voltage losses caused by line resistances which would otherwise cause errors in low-voltage measurements (lines 52-54, col. 1 in Schwindt).

Response to Arguments

Applicant's arguments filed on 3/10/2005 have been fully considered but they are not persuasive.

Applicant's argument that the grating of Huber's fiber laser is not a resonator is not persuasive. The grating is part of a laser, which by definition is a resonator. Furthermore, the usage of the term "resonator" in the specification is in agreement with the function of the grating as used in Huber. More specifically, paragraph [0002] states "[a] photonic resonator can be turned on, i.e., permit the passage of light of certain frequency, or turned off, i.e., not allow the passage of light of a certain frequency..." This is exactly the function of grating 18 in Huber's laser, the grating reflecting, i.e., not allowing light to pass, depending on its period, which in turn depends on the temperature. Regarding Applicant's argument that Huber does not disclose any processor or memory, which would effect the comparison of a measured temperature with a desired value, the examiner asserts that it would be impossible for the device of Huber to operate

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if the device lacked any type of processing means as well as a type of data storage/memory unit in order to compare a measured value against a desired set of values.

Similarly, Applicant's argument that the arrayed waveguide grating of Ueda's WDM multiplexer/demultiplexer device is not a resonator is not persuasive. The usage of the term "resonator" as defined by the Applicant is in agreement with the function of the grating as used in Ueda. More specifically, Applicant's response (fourth paragraph on p. 9) recites "In the present application, the temperature of the resonator directly affects the refractive index of the resonator, thereby determining the frequency selected by the circuit." This is exactly the function of grating 14 in Ueda's device, the grating allowing certain wavelengths to pass to certain output waveguides depending on the spacing between the waveguides comprising the arrayed grating. Regarding Applicant's argument that Ueda does not disclose any processor or memory, which would effect the comparison of a measured temperature with a desired value, the examiner asserts that it would be impossible for the device of Ueda to operate if the device lacked any type of processing means as well as a type of data storage/memory unit in order to compare a measured value against a desired set of values. Finally, Ueda's device does associate temperature with frequency (via refractive index changes), see lines 33-41, col. 4.

Applicant's argument that the claimed invention is not directed to stabilizing a device like the device disclosed by Eggleton is irrelevant to the issue whether the device of Eggleton includes all the limitations of claims 1 and 7. Finally, the assertion that, the Eggleton's device does not provide infinitely variable and precise control of the frequency, is not persuasive, since the fact that only conventional feedback loop is used, does not imply that extensive temperature/frequency logic is lacking.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Leo Boutsikaris whose telephone number is 571-272-2308.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**LEONIDAS BOUTSIKARIS
PRIMARY EXAMINER**

Leo Boutsikaris, Ph.D., J.D.
Primary Patent Examiner, AU 2872
May 25, 2005

